EFFECTS OF MULTISYSTEMIC THERAPY ON JUVENILE DELINQUENCY AND YOUTH CONDUCT DISORDER

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Abstract.
There has been an increase in the need to use research evidence to guide practice especially in human service, because interventions are becoming more patients/clients oriented. The evidence about effectiveness of intervention is further subjected into scientific scrutiny in the interest of those who are affected by it, and in the interest of withholding the scientific values. Multisystemic therapy is a professionally oriented intervention which target youth with problem behavior and their families, with a focus on providing skills to parents to meet the needs of their children. This thesis contributes to ongoing debate about evidence based practice, by appraising the available evidence on MST with juvenile delinquency and youth conduct disorder. The review included 8 randomized clinical trials about MST with juvenile delinquency and youth conduct disorder. Data from the studies were entered in the Review Manager software, whereby a random-effect meta-analysis mode was used to determine MST effect size and heterogeneity.
between studies. The large part of the results did not show the effects of Multisystemic therapy, and did not detect significant heterogeneity between studies. However, some of the outcome measures detected MST effects and one outcome measure detected heterogeneity between studies. The results suggest that effects of MST on juvenile delinquency and youth conduct disorder to a large extent could not be established. But the detection of some effects indicates the possibility that some effects may have not been detected due low statistical power of included studies. Further independent reviews that can include large studies are required, so as to prove or refute the premise that MST has effects on juvenile delinquency and youth conduct disorder.
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ABREVIATION

CI: Confidence Interval
CSPV: Centre for the Study and Prevention of Violence
CSSP: Centre for Study of Social Policy
EBSCO: Elton B. Stephens COmpany
IQ: Intelligence Quotient
MST: Multisystemic Therapy
RevMan: Review Manager
RCT: Randomized Control Trial
SMD: Standardized Mean Difference
UK: United Kingdoms
UN: United Nations
USA: United States of America
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Part I
Introduction, Background to Juvenile Delinquency and Youth Conduct Disorder and Overview of Multisystemic Therapy
1:1. Introduction
Multisystemic therapy (hereby referred as MST) is intensive, time bound, family-centered treatment program for youth referred from juvenile justice system (Henggeler, et al 1998). MST targets chronic, serious, violent or substance-abusing juvenile offenders at risk of incarceration. MST is professionally oriented with a focus on providing skills to parents to meet the needs of their children. MST treatment model incorporate systems such as family, school, peers, neighborhood, coaches and community. MST clinical feature involves a comprehensive assessment of child development, family relations and how family members interact with other systems. (Littell, et al 2005).

MST Model recognizes that delinquency and conduct disorder stem from various factors and the strategies to address it should also address its multiple sources of influence. These sources of delinquency and conduct disorder are not only found within the youth (attitudes and social skills) but within other systems as well, which they also need to be part and parcel of the treatment. Treatment of youth alone without incorporating these systems means, any positive gain from treatment are quickly eroded upon return to the family, school, or neighborhood (Leschied & Cunningham 1998). Treatment programs such as out-of-home placement, boot camps, juvenile detention, residential treatment and psychiatric hospitalizations have proved to be ineffective in achieving positive and lasting outcome. (MST website 1)

This review is based on social work with young people, which deals with different groups of young people such as juvenile offenders, young people with disability, teenager parents, young asylum seeks and refugees (Smith 2008). The review also focuses on community social work which has the role of addressing the needs of young people and empowering different groups in the community. Through community, social work connects young people and children with different projects and clubs, designed to promote their health and prevent them from crime, and help them access the support system available in their communities. Empowerment is an integrated method of social work practice, which is delivered through clinical and community approach, encompassing a holistic work with families, communities, individual groups and political systems (Lee 2001). Empowering adolescents to deal with challenges and dilemmas they face during this problematic stage of human development is a very important part of social
work. Empowering parents, youth/young people and communities to make informed decision about intervention on juvenile delinquency and youth conduct disorder is the core part of this review.

It is important to identify, critically appraise, and synthesize the best evidence from clinical trial so as to (Hawke et al 2009) clearly show the effects of multisystemic therapy on juvenile delinquency and youth conduct disorder. It is also important to note that primary studies have a tendency of overestimating the treatment effects, which may be harmful to patients or clients (Freeman et al 2006). This review is seeking to establish if MST has effects size on juvenile delinquency and youth conduct disorder and whether is consistence across studies.

1:2. Problem of delinquency and youth conduct disorder
Juvenile delinquency emerged as a social problem during industrial revolution. Since then the prevention of delinquency and crime tends to swing between two philosophies; punishment and rehabilitation. Those in favor of punishment have relied on the intellectual power of classical theory, while those who advocate for rehabilitation have relied on learning and attachment theories (Moore, 2004). It has been a tradition for juvenile justice system to advocate and promote the use of treatment or rehabilitation rather than punishment, as the best remedy for reducing delinquency and youth conduct disorder. The main argument is preventing juvenile from becoming delinquents and reduce the risks of recidivism. However, because of the prevalence of delinquency and conduct disorder, particularly during the pick of violent juvenile crime in mid 1980s and 1990s, there were numerous calls for society protection against what was viewed as threat to stability. The calls were for harsh punishment to curb the rise of juvenile delinquency, including incarceration, intensive supervision and surveillance. Most of these sanctions have proved to be ineffective, which resulted in renewal calls for alternative methods preferably treatment. Efforts of dealing with juvenile delinquency and conduct disorder is a vicious cycle; because when initiation of harsh punishment fails to reduce the level of delinquency there is a tendency of switching to treatment and when the treatments do not produce expected results there is a tendency of switching to punishment (Bernard 1993).
Even though delinquency behaviors and youth conduct disorder share some similarities across the world, the magnitude, prevalence and risk factors vary from societies to another. While in most part of the world alcohol and drug abuse has been attributed to juvenile crime, in Africa juvenile crime is associated with hunger, poverty, under nutrition, and unemployment (UN 2005). It is believed that a significant number of adult criminal begins their criminal behavior as juvenile. Taking appropriate action to prevent delinquency is making a step toward preventing the inception of adult criminal career, thus reducing burden to crime on its victims and the society (Greenwood 2008). Juvenile offenders, especially those committing serious crime experience difficulties in education progress and have less occupational opportunities, their criminal activities takes emotional and financial toll both to the victims, their families, communities and taxpayers who have to share the cost (Gottfredson 1989; Greenwood 2008).

According to statistics on the trend of juvenile delinquency, countries on transition such as those in Eastern Europe and Commonwealth of Independent States have seen the rise in juvenile crime for more than 30 percent since 1995. In some Western European countries, underage offenders and juvenile delinquents arrest made rose by an average of 50 percent between mid 1980s and 1990s (UN 2003). Available official crime statistics suggested an increase in violence youth crime in Germany and Eastern Europe between 1990 and 2000 (Enzman & Podana 2010). In the Netherlands social and political interest on juvenile delinquency grew in 1990s, mainly due to the increase in number of violence offences committed by young people (Van der Laan & Smit 2000). In U.S.A statistics showed that adolescents were responsible for approximately 29% of all crime and 17% of violent crime (F.B.I 1991).

Most of the data regarding juvenile crime trend are extracted from local police crime statistics and victimization survey, which may not necessarily provide a true extent of crime rate. Some of offences are not reported, hence not included since each country has its own ways of tradition of collecting these data. In order to know if violence among juvenile is on the rise or decrease and which factors contribute to the change in behavior, repeated international studies are indispensable supplement to international official crime statistics and victimization survey (Enzman & Podana 2010). Violent criminal acts and other serious offences perpetrated by adolescents pose significant problems at several level of analysis, and these problems call for
effective treatment programs. According to Borduin (1999), the development of effective treatment program for violence and criminality among adolescents has been extremely difficult task.

1:3. History and theoretical base of MST
Multisystemic therapy started in early 1980s, but its origin can be traced back in mid-1970s when Dr Scott Henggeler was doing his PhD in University of Virginia; he was hired by the Department of Pediatrics to work with antisocial children. According to MST service website, in 1992 the Family Services Research Center at the Medical University of South Carolina (where Dr. Heggeler and his team works) was formed to pursue the development, validation and dissemination of treatments for youth with serious clinical problems. As published research on MST outcome spread, more communities showed desire to implement it. In order to get results similar to the research, however, the treatment model could not vary from the clinical trials. That meant providers would need assistance in setting up and carrying out MST properly. Currently, MST is implemented in Canada, Australia, New Zealand, UK, Northern Ireland, Scotland, Iceland, Belgium, Norway, Denmark, Sweden, Netherlands, Switzerland and 34 States in USA.

Multisystemic therapy targets chronic juvenile offenders such as those who break in people’s home, beat their parents or siblings, use drugs etc. MST put emphasis on incorporating interconnected systems in the treatment of youth delinquency behavior. This is due to growing evidence that these systems or components of youth life (figure 1) such as family, peers, school, neighborhood and community contribute to delinquency behavior or youth antisocial activities (MST website 1). According to its website, MST treatment model integrate strategies from other pragmatic, problem based treatment model such as cognitive behavioral therapy, behavior management training, family therapies and community psychology to reach its target population.
MST treatment model integrate ecological system theory of human development which view youth as living in interconnected system (Bronfenbrenner 1979). The theory looks at child development within the context of the system of relationship that forms his/her environment. Instead of focusing on a single contributor to juvenile delinquency and conduct disorder (e.g., antisocial attitudes), the MST model consider that antisocial behavior emerges as a result of complex interactions between youth and the various systems in which his/her daily life is embedded (e.g., family, peers, school, neighborhood or community) (Michel-Herzfeld et al 2008), as shown in figure 1. These systems can curb or support delinquency or antisocial behavior depending on the number and combination of risk and protective factors that are present. For example, it has been argued that parents and community gang members who are involved in criminal activities are likely to influence the behavior of their children to engage in delinquency, which in turn can cause problems not only within the family but at the community level as well. The systems influence youth’s behavior, and youth’s behavior influences the
systems. This interdependence is recognized by MST treatment model which seeks to reduce factors that contributes to delinquency behavior and at the same time improving system protective factors (Michel-Herzfeld et al 2008).

The overlapping relationship between a child and family, peers, school, neighborhood and the community shape children’s physical, emotional, social, cognitive and spiritual development. It can be argued that family provides the child with food, water, shelter, sanitation, healthcare, recreation, love and protection. Family provides knowledge and skills about the world, which facilitate independent living for the child. Outside the family circle a child interacts with peers in different activities such as sports, church services which are important in his growth. The school provides the child with knowledge, interaction with other peers, teacher and staffs. The child learns from this interaction and the relationship that develop in school which further facilitate his growth.

At the neighborhood level, the child learns to interact with neighbors by observing how the family and neighbors communicate, share, and treat each other. The child spends most time at home and within the neighborhood, which plays a big role in his learning process. Within communities a child learn some shared cultural and historical heritage, and systems of government, for example, local government in his area and his indigenous support network. The social systems provide support network the child needs to discover his identity. MST therapists take therapy to the troubled youth, by going to where they live (within the family), hangout (recreation centers, in the street with peers) and attend school. This way the therapist gets first hand information of the situation surrounding the youth life.

MST empower parents with the skills and resources needed to independently address the challenges that arise in raising adolescents, and empowering youth with skills to cope with problems associated with other systems. Specific goals and the interventions to achieve them are designed jointly with the youth’s caregivers, who also implement the greater part of the interventions, in the beginning with the instrumental and social support of the therapist (Schoenwald et al 2008). Since there is variation in demand for each case, MST therapist must
be able to apply a range of empirically therapeutical approaches and tailored interventions to meet the needs and strength of each family (Henggeler et al 1997)

1:4 MST principles and logic mode
MST developers believe that the chances of success will be higher, if MST is delivered in accordance to its nine principles. The nine MST principles are described below.

1: Finding the fit
Assessment is made to understand the "fit" between identified problems and how they play out and make sense in the entire context of the youth's environment. Assessing the “fit” of the youth's successes also helps guide the treatment process.

2: Focusing on positives and strengths
MST Therapists and team members emphasize the positives they find and use strengths in the youth’s world as levers for positive change. Focusing on family strengths has numerous advantages, such as building on strategies the family already knows how to use, building feelings of hope, identifying protective factors, decreasing frustration by emphasizing problem solving and enhancing caregivers’ confidence.

3: Increasing responsibility
Interventions are designed to promote responsible behavior and decrease irresponsible actions by family members.

4: Present focused, action oriented and well defined
Interventions deal with what’s happening now in the delinquent’s life. Therapists look for action that can be taken immediately, targeting specific and well-defined problems. Such interventions enable participants to track the progress of the treatment and provide clear criteria to measure success. Family members are expected to work actively toward goals by focusing on present-oriented solutions, versus gaining insight or focusing on the past. When the clear goals are met, the treatment can end.
5: Targeting sequences:
Interventions target sequences of behavior within and between the various interacting elements of the adolescent’s life—family, teachers, friends, home, school and community—that sustain the identified problems.

6: Developmentally appropriate
Interventions are set up to be appropriate to the youth’s age and fit his or her developmental needs. A developmental emphasis stresses building the adolescent’s ability to get along well with peers and acquire academic and vocational skills that will promote a successful transition to adulthood.

7: Continuous effort
Interventions require daily or weekly effort by family members so that the youth and family have frequent opportunities to demonstrate their commitment. Advantages of intensive and multifaceted efforts to change include more rapid problem resolution, earlier identification of when interventions need fine-tuning, continuous evaluation of outcomes, more frequent corrective interventions, more opportunities for family members to experience success and giving the family power to orchestrate their own changes.

8: Evaluation and accountability
Intervention effectiveness is evaluated continuously from multiple perspectives with MST team members being held accountable for overcoming barriers to successful outcomes. MST does not label families as “resistant, not ready for change or unmotivated.” This approach avoids blaming the family and places the responsibility for positive treatment outcomes on the MST team.

9: Generalization
Interventions are designed to invest the caregivers with the ability to address the family’s needs after the intervention is over. The caregiver is viewed as the key to long-term success. Family members drive the change process in collaboration with the MST therapist. (Adopted from MST website 2)
MST applies family preservation service delivery model, which provide services that are time bound to the entire family (Henggeler 1998). A typical duration of MST treatment is about four month, (CSPV website 3). However, in some other cases the treatment can take less or more time, see figure 2. The treatment plan is carried at home and family driven, with low caseloads (4-6) to the therapists which allows intensive services (2-15 hours per week) to be provided to the family depending on the clinical needs (Henggeler 1998; Michel-Herzfeld et al 2008).

Figure 2: MST Logic mode
Therapists are mental health professionals with master or doctoral degree (in some countries professionals with bachelor degree qualify as therapist) and are available to respond to clinical problems 24 hours a day, 7 days a week (Littell et al 2005). The intensity of the therapy can partly be attributed to effectiveness of MST. The availability of therapist at all time, assure the clients that their needs have priority and they can get help when they need it. It also facilitate therapist-clients working relationship.

Therapists make assessment of youth's and family needs, available resources and set goals. Assessment process is taken at the first week during enrolment and save the purpose of gathering information necessary for formulation overreaching treatment goals. In the beginning of this stage the Therapist attempt gather as much information as possible about particular behavior of the youth which subsequently resulted into the referral to MST. The nature of the youth problem behavior frequency, duration and intensity is gathered, and special attention is drawn to behavior which put the youth in the risk of re offending. Strength and need assessment form that represent all five systems targeted by MST (youth, family, peers, school, neighborhood, and community) is completed by working with the family. This stage allows the therapist obtain to the information that say about specific youth attributes, and system strengths that can be applied to deal with known risk factors. (Michel-Herzfeld et all 2008)

MST program activities target factors in youth's ecology that are contributing to antisocial behavior, identify determinants of problem behavior and identify strengths of the youth and family. Treatment goals/strategies build on strengths and are established by therapist and family together. (Michel-Herzfeld et al 2008). The therapist works with family to identify their strength (e.g. love of the adolescent or social support) and make use of them to overcome barriers to caregiver (ie, parents or guardians) effectiveness (e.g caregiver addition or substance abuse). As the ability of the caregiver improves (eg the capacity to support, supervise and monitor the children), the therapists assist the caregiver to design and implement the intervention with the aim of reducing youth delinquency and improving youth function across family peer, school, community context. (Henggeler & Schaeffer 2010)
MST intervention focus on enhancing caregiver performance, improving family relations, reducing youth association with deviant peers, increasing youth involvement with pro-social peers, improving youth school or vocational performance, engaging youth in pro-social recreational outlets, and developing an local support network of extended family, neighbors, and friends to help caregivers achieve and maintain such changes (CSPV website 3)

1:5 Social work and MST

Youth with delinquent behavior represent the individual who social work is thriving to promote his/her problem solving skills, and enhancing his/her well being. Social work practice with young people is rooted in principles of social justice, and effective social work practice is more than following guidelines but developing skills that will enable social workers to meet day to day challenges of working with young people (Smith 2008). Relationship is one key area of social work focus, since delinquency problems mostly emanate from broken relationships. When the children develop a positive relation with parents, guardians or caregivers, they feel loved and protected. This feeling helps them to deal with challenges they face when they are growing. Resilience in children is improved when they develop attachment to caring parents/caregivers (Fernandez 2007). Social work engage juvenile delinquents and youth with conduct disorder from underprivileged groups such as minority ethnic groups and poor families. Social work play a part in MST treatment, its knowledge of individual problems and social relations is crucial in facilitating treatment and guide youth during the transition period into adulthood.

Social work with young people includes child protection, advocating children’s rights to express their opinion, right of education, health care; assisting families to improve broken relationships and empowering families to cope with challenges arising from daily living. Children learn by observing certain modeling behavior from their parents, which they later perform in their lives. Parents who fight in front of their children are likely to cause emotional instability to their children which can lead to negative impacts on their growth. For example, children and adolescents whose parents manage disagreement through violent and despicable manner can learn that intimidation and dominance are the right way of dealing with interpersonal problems (Jeong & Eamon 2009). Jeong & Eamon 2009, p 234) argue that, since delinquency is a familiar and serious problem, understanding family processes and other factors that put youths at risk of
such behavior has significant implications for practitioners who develop prevention and intervention strategies for delinquent and related behavior. Social workers are among the practitioners taking part in MST; they have a good knowledge about the nature of these family processes, delinquency and conduct disorder among youth in their locality. Social workers are also part of professionals who makes up the therapist pool. As explained earlier, MST therapist are mental health professionals with master or doctoral degrees in social work, marital family therapy, counseling or related discipline like psychology, however people with related bachelor degree and significant clinical experience in treating serious antisocial behavior in youth can also apply (Henggeler & Schaeffer 2010; Littell et al 2005, and MST website 4).

School social workers provide counseling and other form of psychological to children and youth which help them to adjust in school life (empowerment). Social workers assist adolescents to deal with peer pressure and overcome different dilemma they encounter during this transition period to adulthood in school setting. MST works with juvenile delinquent in school environment which means among the people to come in contact with are social workers who have a role of empowering students/pupils, teachers, parents and community. Empowerment social work is viewed from ecological perspective, critical theory and affirmative form of postmodernism as the practice of social workers in political activities by organizing service users (students/pupils and parents) and service partners (community, school staffs and youth workers) to protect students rights and creating a conducive learning environment and initiating positive reforms in school and education system (To 2007).

Youth behavior is largely influenced not only by the family but other people who surround them. In this case community or the neighborhood and peers play a major part in youth behavior development. Social work is involved in community work, such as social planning, policy analysis and advocacy, evaluation of community projects, community organization, mobilization and development. Social workers thrive to promote social justice and empowering communities to make use of available resources to enhance their well being. Children and youth wellbeing is important in existence of communities. Social work is involved in youth development programs which prepare them to meet the challenges of adolescence and adulthood through series of well structured and progressive activities which aim at equipping youth emotional, social, ethical,
physical and cognitive competence. Youth development program may include employment, education, civil involvement, pregnancy protection, parenting, substance abuse and responsible sexual behavior programs (Hair et al. 2003).

Social work facilitates social connection among peers and helps individual peers overcome peer pressure which leads to delinquency and conduct disorder. Peers are very important aspects in Samoa youth, for example. Samoa families have strong kinship ties which makes them live in close proximity to their extended families and youth have their relatives as peers. Peer pressure in this case can have a high influence on the youth because the peers are also friends and family. (Godinet & Vakalahi 2008). Community social workers engage in collaborative activities like working with agency representatives, and other appropriate community stakeholders; to identify community needs and develop appropriate strategy to address them. Instead of only focusing on stopping youth from engaging in risk behaviors, social workers engage in positive youth development in partnership with youth and the community by creating positive goals and outcome for all youth in the community.
Part II

Theoretical Background
2.1 Classical Theories of Delinquency

2.1.1 Differential Association Theory

Edwin Sutherland is credited for developing differential association theory in 1939 where he proposed that individual learns the attitudes, techniques, values and motives for criminal behavior through interaction with others. The focus of the theory is mainly on how individual learns to become criminal. Sutherland (1947) believed that criminal behavior emerges when individual is exposed to environment which favors criminal behavior. In his fourth edition of principles of criminology he presented his final theory with nine principles. (1) Criminal behavior is learned, (2) Criminal behaviors are learned in interaction with other persons in a process of communication, (3) Learning criminal behaviors occurs within their most intimate groups and personal companions such as family, friends and peers, (4) Learning criminal behavior involves learning the techniques, motives, drives, rationalizations, and attitudes of committing crime, (5) The specific direction of motives and attitudes is learned from definitions of the legal codes as favorable or unfavorable, (6) Individual becomes a criminal when there is an excess of definitions favorable to violation of law over definitions unfavorable to violation of law, (7) Differential associations vary in frequency, duration, priority, and intensity, (8) The process of learning criminal behavior involves all the mechanisms involved in any other learning, (9) Although criminal behavior is an expression of general needs and attitudes, criminal behavior and motives are not explained nor excused by the same needs and attitudes, since non criminal behavior is explained by the same general needs and attitudes. (Sutherlands 1974; Pfohl 1994; Leighninger & Popple 1996; Gaylord et al 1988)

He argued that a person who has not been previously exposed to criminal environment can not invent crime or inherit criminal acts. His theory predicts that an individual will choose the criminal path not only because of contact with criminal model, but also because of lack of contact with anti-criminal model. However, Sutherland did not mean a mere association with criminals will lead to criminal acts but viewed crime as conflicting values for example law-abiding and law-breaking. He believed that individual association with criminals is determined in a general context of social organization (Sutherland 1974). In early life of individual those of high status within his life has great influence in his behavior, which means the more likely the individual to follow in their footsteps. The theory suggests that when children are associated with
delinquent peers, have likelihood of becoming delinquent, since peers can be important role models for the development of values and beliefs favorable to criminal behavior. Exposure to delinquent peers will increase the prospect of engaging in an initial act of delinquency and the possibility of delinquent behavior reoccurring (Smith & Brame 1994). Unfortunately it is difficult to establish which occurs first between delinquent friends or delinquency behavior which may be argued that juvenile delinquents may prefer to associate with each other rather than gangs and peers being the primary factor (Haynie & Osgood 2005)

2.1.2 Social Control Theory.
Social control theory states that individuals participate in delinquency because they lack strong affective attachments to parents, stakes in conformity, involvement in conventional activities, and belief in conventional norms. It emphasizes that people's relationships, commitments, values, norms, and beliefs encourage them not to break the law or engage in deviant acts. The early proponent of social control theory such Reiss (1951), believed that delinquency emanate from failure of individual to refrain from meeting needs through means which conflict with social norms. In this regards the individual become delinquent because of failure personal and social control. Jackson Toby believed that youth who are not committed to anything are likely to be recruited in gangs, which ultimately leads to delinquency behavior. He believed that all adolescents could be tempted into delinquency behavior but some refuse because they have a lot to lose (Toby 1957).

But it was the work of Travis Hirschi (1969), the most prominent theorist of social control who argued that people will engage in delinquency behavior when their social bond is destabilized. The concept of social bond comprises of four elements, attachment, commitment, involvement and belief. Hirsch believed that attachment between parent and a child is vital, and the strength of this relationship is the most essential factor in preventing delinquent behavior. He also believed that individual with strong attachment with the society are less likely to engage in delinquency behavior, while individual with weak attachment are more likely to deviate from social norms. When individuals have strong attachment to the family, friends, community institutions like churches, it is less likely that they will deliberately engage in behavior that will harm the attachment (Reginald et al 1995). Commitment element refers to the extent to which an
individual has invested in social activities and institutions (Hirsch 1969). He argued that a person who has devoted time, energy and resources in abiding with social norms and expectations like following education goals, is less likely to be delinquency than individual who have not made such investment, because they have more to lose than their counterparts.

In involvement element of social bond, he argued that when individual spend large amount of time in socially approved activities, then the less time has on delinquency behavior (Reginald et al 1995). This argument suggest that when children are engaged in activities such as sports, school projects and scouts they will have less time to spend on behavior like alcohol consumption, theft and vandalism. In the element of believe, Hirsch believed individual level of belief in social norms can influence his conformity. He believed that an individual with strong belief in social norms is less likely to offend or engaged in delinquency, but those who question these norms are likely to deviate from them. The theory suggests that children with low level of belief on social norms are likely to become delinquency, than those who have been groomed to abide to them.

2.1.3 Strain theory
Strain theory affirms that social structure within society may be responsible for pressure which drives individual to commit crime. The theory was developed from the concept anomie of Durkheim and later advanced by Merton. Durkheim focused on the decline of societal restraint and individual level strain, while Merton focused on culture, structure and anomie. The concept of anomie focus on inability of the society to set limit on the goals and put checks on individual conduct, and the reasons for increasing likelihood of deviance as a result of collapse of the society. In this regard the decrease in society regulations creates pressure for individual to become deviant (Agnew & Passas, 1997).

Merton analyzed the cultural imbalance that exists between goal and the norms of the individuals of society, and argued that balance is maintained as long as the individual feels that he is achieving the culturally desired goal through conforming to socially acceptable means (Merton 1938). He suggested there is societal expectation on people ambition for upward mobility and a desire for selected goals and when socially acceptable means to reach the goals is barren, strain
set in, which in turn compels the individual to violate the law in order to attain these goals. He believed that the society which put emphasize on goal attainment over the means to realize them and put restriction on access to legitimate means to achieve them is creating an environment for future criminals.

Robert Agnew (1992) proposed general strain theory which did not focus on structural or interpersonal but on emotion and individual. He suggest that strain from the outside environment can lead to negative feelings such as fear, defeat and hopelessness to individual, but its anger which is most applicable to crime. He argued that individual becomes angry when they blame their negative situation and relationship on others. He believed that anger can drive individual to commit crime, show low inhibition, have desire for revenge, and with addition of frustration it can enable individuals to justify their criminal acts (Agnew, 1992, 1995). The theory proposes that adolescents are involved in delinquency behavior because of the frustration and anger about the negative situation they experience in their lives. They commit these acts as a revenge for those who put them through negative experiences. On other words adolescents who were exposed to negative circumstance such as domestic violence, are likely to be involved in delinquency behavior as part of emotion reaction to their experience.

### 2.1.4 Subcultural theory

The origin of subculture theory can be traced from Chicago school and as an extension of strain theory. Chicago school stressed that humans are social creatures and their behavior is the product of their social environment which provides values and definitions that govern behavior. But due to urbanization and industrialization order and more cohesive patterns of values are broken down, hence creating communities with competing norms and value systems (Criminological theory on the web 5). Subculture theorist argues that certain groups in the society have set of norms, values and beliefs different from those of the mainstream culture which are favorable for crime and violence. They believed that when these values, norms and belief systems are at odds with those of the larger culture, members of these groups or subculture are more likely to get into problem. The theory stress that delinquency subculture emerges as a result of some problems which member of the mainstream do not experience. In other words delinquency may occur
when adolescent follows norms and values of their immediate environment (eg gangs) that put them in violation of the law.

In studying delinquency Cohen (1955) found that juvenile delinquency was more prevalent among lower class males and the most common form of this was the juvenile gang. He believed that certain condition in the society make youth incapable of achieving success through legitimate means, lower-class youths experience a form of culture conflict which he labels status frustration. He notes that the family position in the social structure decide the problems the child will encounter in future. He believed lower class families’ ambition and planning must give way to current pressing issues, unlike middle class families which have means to achieve it. He also argued that middle class have dominant value. This leads to status frustration and strain eventually youth from lower class families adapting into delinquency subculture that reject the middle class values (Cohen & Short 1958). The reason for this is lack of the ability to succeed despite their aspiration for intellectual or occupational success. Therefore they resort to a process Cohen calls reaction formation. Reaction formation means the individual reacts with extreme response to situations and has no problems in risk taking and breaking the law. A delinquency subculture in this regard is created to resolve problems that lower class people face.

Cloward & Ohlin (1960) reported in their research on delinquency that there are three distinct types of delinquent subcultures, the criminal, conflict, and retreatist subcultures. The criminal subculture emerges in areas with well established organizations of adult criminals which provide youth with unlawful opportunity structure for them learn the tricks of the trade. Conflict subculture emerges when delinquents often form conflicting gangs out of frustration due to lack of available opportunity structures. Retreatist subculture emerges from youth who cannot fit within legitimate groups in society or within criminal and conflict subculture. Miller (1958; 1959) concurred with Cohen on the existence of delinquency subculture but differed with him on how delinquency emerged. He argued that delinquency subculture emanate from values of lower class, which is naturally at discord with that of middle class. He states that parents from these families are working hard to ensure that their children stays out of trouble, unlike middle class families which are goal oriented. Children from lower class families are groomed to be smart and tough which give them incentive to be involved in criminal gangs. He viewed their lives as
boring and involvement in crime brings in excitement and sense of autonomy by rejecting social control imposed by the state.

2:2 Significance of Delinquency Theories.
The classical differential associations, social control, strain and subculture theories of delinquency draw attention to the different argument on causes of, and how to prevent delinquency. These theories shows how people see the same problem differently, propose different means of addressing it. As the society evolves problems also evolve, which means as problem becomes complex, they call for or require complex interventions. Each theory present valid arguments that are important in developing interventions, and facilitate future research on juvenile delinquency and youth conduct disorder. Understanding the present requires looking at the past, because the past form the foundation of the present. These classical theories provide diversify knowledge of the problem of juvenile delinquency, which offer options of developing means of addressing it. Having options gives the practitioner opportunity to apply the theories basing on situations and time, since the situations and time influence problem differently.

The way in which MST operates requires understanding of these classical theories. Strain and social control theories facilitate the work of MST services with individual juvenile delinquency by explaining the possible causes of youth behavior, and ultimately using the same knowledge in addressing the youth’s needs. Knowledge of social control and subculture theories is important in explaining family relations for youth receiving MST services. For example, through its work with neighborhood and peers, MST can apply differential association, strain and social control theories in understanding the influence of peers and neighborhood in youth delinquency. These theories are central in helping the therapist to understand how specific communities are organized, and how to make use of available community resources in addressing juvenile delinquency in specific locality. The theories are among the tools which MST staffs requires in planning and delivery of services intended to address the needs of juvenile delinquents and youth with conduct disorder.
2.3 Risk and protective factors

Juvenile delinquency and youth conduct disorder call for comprehensive interventions that address its root causes, develop preventive measures and facilitate sustainable development of a health society. It’s vital that factors that put young people at risks and those which protect them for potential problems are known, in order to put together preventive interventions (Simões et al. 2008). Risk factors are internal or external pressure that raises the likelihood that an individual will take part in antisocial behaviors, such as crime or substance abuse. Protective factors on the other hand are influences which are likely to decrease antisocial behaviors and improve the likelihood of an individual to engage in social activities and other positive behavior (Werner 2000; Masten & Coatsworth 1998).

The absence of protective factors is likely to lead youth into delinquency behavior; however, Loeber & Farrington (2001) argued that the presence of a single protective factor doesn’t guarantee that youth with multiple risk factors will not become delinquent. They also argued that, no single risk factor can explain child delinquency, but the higher the number of risk factors or the higher the domain of risk factors the likelihood of early onset of delinquency behavior. Risk factors can be categorized into five groups, individual, family, peers, school and community risk factors as showed in Figure 3.
2:3:1 Individual risk factors

Individual child or youth genetic, emotional, cognitive, physical and social characteristic have connection to child or youth delinquency behavior. According to clinical studies of hyperactive children (Loeber et al 1995) the results shows that they are at risk of delinquency. Children ability to deal with emotion at early age, can contribute to future behavior. For example, anger, pride, shame and guilt are common emotion expression in human life. Parents, peers, teachers can influence the way a child express these emotions, for example if a child didn’t learn to manage his anger in a positive way, it can facilitate delinquency behavior. Poor cognitive
development is associated with delinquency when a child fails to learn social rules. For example, a number of studies have shown that delinquents’ verbal IQs tend to be lower than their nonverbal IQs (Moffitt 1993)

2:3:2 Family risk factors
Studies indicate that inadequate child-upbringing practices, domestic dispute, and child maltreatment are associated with early-onset delinquency (Derzon & Lipsey 2000). Divorce has big impact on children emotions, for example anger, and separation of parents is likely to hinder their ability of children to deal with emotions. Depression reduces the capacity of parents to care for their children. When parents are depressed their ability to provide adequate upbringing of their children is hampered giving way to increased antisocial behaviors in children, such as inconsistency, irritability, and lack of supervision (Cummings & Davies 1994). Neglected children are at risk of becoming delinquents, since their development have been compromise. The same can be said about abused children, as evidence in (Widom 1989) suggests that children with history of neglect or abuse accrued more juvenile and adult arrest at 25 years of age, compared with children who have not been abused or neglected. Parents are role model to their children, when parents are involved in antisocial behavior, is likely that their children will learn from them, hence becoming delinquents at certain point in their lives. High rates of parental substance abuse and depression are reported for parents of boys with conduct problems (Robins 1966). Parents who are alcoholic or drug addict are at risk of abusing or neglecting their children.

2:3:3 Peer risk factors.
When children or youth associate themselves with deviant peers, their behavior can or cannot be influenced. Snyder et al 2005 argued that, the growth of in conduct problems in children which escalate rapidly in late childhood into adolescences is associated with peer processes. When children play or go to school together with their peers there is a probability that some of them can adopt the behavior of other for reason like to be famous, to be cool or to exercise some power upon others. Children and adolescents struggle to get approval from their peers, as results in a study (Trucco et al 2011) suggested that high level of peer delinquency prospectively perceived peer approval. Trentacosta & Shaw (2009) examined emotional self regulation, peer rejection and antisocial behavior among boys from low income families in which they results
suggested that there is a positive association between peer rejection and antisocial behavior. High level of peer rejection is also associated with high level of reactive aggression which was associated with peer delinquency which consequently envisaged substance use (Fite at al 2007).

2:3:4 School risk factors
The results from a Meta analysis of over 100 studies which examined the relationship between poor academic performance and delinquency suggested that, poor academic performance is associated with frequency, prevalence, onset and seriousness of delinquency (Maguin & Loeber 1996). Another study suggests that poor school bonding and dedication in addition to poor teacher bonding were found to be stronger determinants of delinquency for adolescent males than for females (Freidenfelt et al 2011). Academic achievement and school bonding are to a great extent interdependent. Children with poor academic performance are likely to have problems with bonding with others hence having low anticipation on their success. Low motivations to reach high academic achievement make the child vulnerable to peer pressure and poor cognitive development.

2:3:5 Community risk factors
Teenage homicide is partly associated with the increasing in their access to weapon particularly hand guns. Teenager’s ordinary fights were turned into homicide by use of guns. The statistics shows that in recent years the number of youth violence has dropped compared to that of 1980s and 90s. One of reasons for this drop is attributed to law enforcement effort in controlling youth access to guns (Blumstein 2002). Poverty leads to inability to meet human needs such as health care, food, shelter, clothing, education and security. In order to survive people find themselves in situations which they did not choose like being involved in criminal activities. Children from disadvantaged and underprivileged families are at bigger risk of offending than children from affluent families (Farrington 1998). Disorganized neighborhood may lack social control and have weak social control network which allows criminal activities to go unchecked or unnoticed (Elliott et al 1996) Adolescents spend longer in front of TV and video games that portrays violence. Research suggests that repeat viewing of aggressive media content can potentially promote aggressive attitude and behaviour (Strenziok et al 2010) while majority of violent video
games may be a source of children exposure to violence and provide the players with simulated acts of violence (Haninger 2004)

2.3 Protective factors
They sometimes exist naturally in the individual’s environment or can be created through preventive strategies and interventions which are developed by professional practitioners such as social workers, psychologists and teachers. Protective factors are dependent on the environmental, financial, emotional and social settings of the individual child. Individual child resilient, expectation, problem solving skills and high motivation are important protective factors at individual level. However, families and communities are key protective factors which offer the means necessary for creating a stronger, more resilient individual. Effective parenting, clear standard, supportive, caring, nurturing parents facilitate the development good behavior of the children. Social connections helps build social network, which assist parents to reinforce the community norms, provide assistance at the time of needs and serve as resource tool for exchanging knowledge and information about parenting and problem solving (CSSP website 6)

Communities which offer adequate and equal opportunities, facilitate the health growth of children and adolescents. When schools are provided with adequate financial and political support they can plan and execute programs that can help prevent the children from risk behavior such as drug use, vandalism and theft. Community recreational facilities help the children to engage in activities that keeps them busy and off negative thoughts. Police protection makes community members to feel safe, and provide a reminder of community norms and sanction. Through the community children and adolescents can be taught about the importance of maintaining order and consequences of not abiding to the rules.
3. Rationality for this review

3.1 Evidence of MST outcome

Several studies focusing on the effectiveness of MST on juvenile justice population have been conducted since its development in the late 1970s (Michel-Herzfeld et al. 2008). Majority of these studies were clinical trial in which participants were randomly assigned to treatment conditions. Most of these studies have suggested that MST is more effective treatment program for juvenile delinquents compared to others. Other literature suggests that MST is preferred intervention, while others suggested that there is no enough evidence to suggest that MST is more effective treatment of youth with conduct disorder or juvenile offenders/delinquents. Most available literature regarding MST originated from the USA given the history and scope of MST services, however, some literatures from other countries where MST operates can also be retrieved in different databases. This part describes in short, the empirical studies that have been conducted to evaluate MST outcome and effectiveness.

Two independent studies conducted to evaluate the effectiveness of MST in treatment of serious juvenile offenders, with particular focus on reduction of substance use and abuse, in Simpsonville, South Carolina, and Columbia, Missouri researchers suggested that MST has produced a significant decrease in both drug related arrest after treatment compared to those who received other services (Henggeler, et al. 1991). Where in evaluating MST with violent and chronic juvenile offenders, the result showed improved family and peer relations, decrease of out-of-home placement by 64% and decrease in re-arrest whereby only 42% youth receiving MST were arrested compared to 68% of youth who received probation with this decreased continuing two and half years after treatment (Henggeler, Melton, & Smith, 1992; Henggeler, Melton, Smith, Schoenwald, & Hanley 1993). Schaeffer and Borduin, (2005), examined the long-term criminal activity of 176 youth who had participated in MST, in a randomized clinical trial. After 14 years follow up, the result showed a significant drop in number of arrest by 55% and 57% reduction in days spent in placement compared to youth who participated in individual therapy.

Basing on MST model, program activities during treatment should also result in significant improvement in parenting behavior and overall family functioning (Michel-Herzfeld et al. 2008).
Evidence shows that MST is recognized for ameliorating adjustment problems among juvenile offenders by increasing their functioning and decrease in re-arrest or criminal activity, decreases in substance use (Timmons-Mitchell, Krishna, Bender, & Mitchell 2006; Henggeler, Halliday-Boykins, Cunningham, Randall, Shapiro & Chapman, 2006). Results from two evaluation studies of MST among Norwegian youth with serious antisocial behavior, showed decreased externalizing and internalizing symptoms, decreased out-of-home placement, increased consumer satisfaction and social competence (Ogden & Halliday-Boykins, 2004; Ogden & Hagen 2006). MST is also credited for increasing attendance of juvenile offenders in regular school setting (Henggeler, Clingempeel, Brondino & Pickrel 2002).

### 3:2 Why Synthesizing the Results

There is enormous amount of information which researchers, consumers, practitioner, policy makers, and service providers receive from scientific community every year. The diversity of methodology often leads to different results and conclusion about a phenomenon in question. The methodology applied diversity and high volume of studies particularly, but not limited to, in the field of health care and medicine, call for systematic review. Systematic review is scientific undertaking which involves assembling of evidence, critical appraise of evidence and synthesizing results. Systematic reviews are transparent, rigorous, and replicable (Badger et al 2000). Systematic review is a departure from traditional narrative review and expert commentary which are highly influenced by the reviewer’s impulse. Recently systematic review has become very popular to the extent that some regard it as “gold standard” of Evidence Based Policy Movement (Young et al 2002). However, for the purpose of this review, systematic review is considered as the best method of combining results from MST clinical trials, to assess the effect size and consistence across studies.

Systematic review is an important tool for translating knowledge into action, assist researchers and policy makers to identify gap in knowledge and area where research is not needed (Sweet & Moynihan 2007). MST is the intervention which is comprehensively studied and documented but there are few systematic review conducted about the intervention. The spread of MST services indicate the popularity of the intervention, which will likely to attract more locations to replicate this intervention. Due to the nature of MST clients, it is important to learn more about the
interventions. The more knowledge about MST is made available, the more chances for informed decision for replicating it elsewhere, and the more independent youth and families will be on making decision about appropriate intervention to meet their needs. Systematic review provide not only the best way to measure the effect size of MST, but it also provide an opportunity for independent studies from researchers who have no affiliation with MST. Systematic review challenges the methodology employed in evaluating effectiveness of MST, and therefore making future research to use more rigor methodology in its analysis.
Part III

Objectives and Methods
4. Objectives

The main object of this review is to summarize the best available evidence on effects of multisystemic therapy on juvenile delinquents and youth conduct disorder. The review also intend to contribute to the knowledge about evidence based practice in social work, through appraising methods and evidence from included MST studies on juvenile delinquency and youth conduct disorder.

The study intended to answer the following questions;

Does MST has effects on juvenile delinquents and youth conduct disorder?

Are the effects of MST consistent across studies?
5. Methods

5:1. Criteria for considering studies for this review

5:1:1. Types of studies

Studies that have focused on measuring the effects of multisystemic therapy on juvenile delinquents or youth antisocial behavior were included in the review. Studies that used multisystemic therapy but the target population was other than juvenile delinquents or youth with conduct disorder were exclude from the study. The review included primary studies as well as follow up studies (studies that used the sample which was previously used in clinical trials but at different time and for the purpose of measuring the effects after extended period of time, but they are not review of primary studies).

5:1:2. Types of participants

This review included studies which consisted of youth who were involved in delinquent acts or have clinical diagnosis of conduct disorder. Two studies had a sample of juvenile sexual offenders, one study had a sample of substance abuse and dependence juvenile offenders, two studies had sample of youth conduct disorder, one had a sample of youth behavioral problems, one had a sample of serious and violent juvenile offenders and one had a sample of juvenile offences. All youth participated in these studies took part in randomized clinical trial with multisystemic therapy and control trial.

5:1:3. Types of interventions

Included studies had MST as the treatment approach, including licensed by MST Inc. and control group. Included studies used random assignment/randomized control trials of participants to MST and control groups (individual therapy, treatment as usual, regular services and usual community services). The included studies used pretreatment and post treatment assessment measures and/or follow-up assessment measures. The included studies in the review had no geographical boundaries. However, only studies in English were included in this review.

5:1:4. Types of outcome measures

The following outcome measures were observed in this review.
- Self Reported Delinquency
- Arrest
- Substance use (Alcohol and drug dependence)
- Out-of-home placement
- Internalizing and externalizing symptoms/behavior
- Violent offences


The search for included studies spanned from year 1997 through 2011. The time period was chosen so as to lower the probability of selecting similar studies for this review which has been used in previous MST systematic review. The databases searched included EBSCO, Elsevier, PubMed, PSYINFO, and CSA. Google was also searched so as to try and capture other useful data including books, bibliographies and articles that cannot be found in other database. The search keywords, title and abstract information used included (multisystemic or multi-systemic) AND (therap* or treat*) AND (research or outcome) OR (juvenile delinq* or offen* and conduct disor* or beh* or probl*). All included studies in this review were published studies and are available in electronic databases. The full texts of included studies were extracted from these electronic sources.

5:3. Data collection and analysis.

5:3:1. Selection of studies
The reviewer independently screened 116 individual studies, titles and abstracts identified in the electronic searches for relevance. After appraising the titles, abstracts and studies, the reviewer extracted 16 studies with full texts for inclusion in this review. All studies with no reference to effects or outcome of MST juvenile/adolescence/youth delinquents or offenders or conduct disorder or behavioral problem were not considered for inclusion in the review. The 16 extracted studies were further appraised whereby 8 were included in the review and 8 were excluded for not meeting all criteria set for review. Included and excluded studies and their characteristics are presented in the appendix.
5:3:2. Data extraction and management
Data from included studies were extracted by using Cochrane data extraction form. The most important and relevant data from each study were recorded separately. Only data from randomized clinical trial of MST and control group were extracted. Continuous data were then entered individually into RevMan 5 for analysis. Other data such as characteristics of studies, participants and interventions were also entered in RevMan and described separately in the appendix.

5:3:3. Assessment of risk of bias in included studies
The review adopted method described by Jüni et al 2001 to assess risks of bias in included studies. This method include, allocation of intervention (methods used to generate allocation and grading), concealment of allocation (method used to prevent foreknowledge of group assignment in RCT), blinding (method used to prevent participants or personnel from knowledge of which intervention participants will receive) and intention to treat (method of analyzing participants according to the intervention which they were allocated). For the purpose of this review only studies which used random allocation were included in the review. The review also included studies that indicated adequate concealment of the allocation such as centralized randomization and sealed envelope, and those which indicates that concealment of allocation was inadequately done such as coin toss or when other method of concealment was applied.

5:3:4. Measures of treatment effect
Standardized mean difference (SMD) was applied for continuous data because individual studies which measured the same outcome used variety scales, so as to provide a uniform scale before they were combined.

5:3:5. Data synthesis
Some individual studies are too small to detect small effects, but by combining several studies it provided the chance of detecting small effects, also to answer questions not posed by individual studies (Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.1). Therefore, a Meta analysis technique was used to determine direction of multisystemic therapy effects, effect estimates (using null hypothesis that there are no effects) and whether effects are
consistent across studies (heterogeneity). Data synthesis was done using RevMan 5 (Review Manager) software, which was obtained from Cochrane homepage (Cochrane website 7). The confidence interval of 95% was applied in SMD for random-effects models.
Table 1: Characteristics of Included Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Methods</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borduin, C.M 2009</td>
<td>Random assignment to treatment conditions. Data collected at pretest-8 years post treatment</td>
<td>48 juvenile sexual offenders with average age of 14 years, 95.8% boys and 4.2% girls. Their previous arrest is averaged 4.33 (SD=4.81) for sexual (M=1.62) and non sexual (M=2.71) offences.</td>
<td>MST (30.8 weeks) and UCS (30.1 weeks)</td>
<td>Arrest of sexual crime, arrest of other crime and out-of-home placement</td>
<td>Recruitment of participants in treatment conditions was conducted from July 1990 through November 1993 and follow-up continued until October 2001</td>
</tr>
<tr>
<td>Henggeler, S.W 2002</td>
<td>Random assignment to treatment. Data collected at pre-treatment, post treatment, 6 month post treatment and 12 month follow-up. The current sample is from 4 years follow-up</td>
<td>80 juvenile offenders (out of 118 from the original sample) meeting the DSM-III criteria for substance abuse. The average age of the current sample is 19.6 years, 76% boys and 24% girls, 60% African American and 40% White</td>
<td>MST Therapists were master level clinicians supervised by Child and Adolescent Psychiatrist. The Therapist had provided each family with 46 contact hours over an average 130 treatment periods. USC services were provided by Probation Officers, which involved weekly attendance at group meetings, and addition residential and inpatient services when need arise.</td>
<td>Self reported delinquency, drug use, internalizing and externalizing behaviour</td>
<td>There were 38 dropouts (from 118 original samples at pre-treatment) out of which 19 refused to participate, 13 could not be located, 4 were in prison and 2 died.</td>
</tr>
<tr>
<td>Letourneau, E.J 2009</td>
<td>Random assignment to treatment conditions MST and TAU-JSO. Data were collected at pre-treatment, 6 month follow up and at 12 month follow up. Factorial design with randomized assignment was employed.</td>
<td>127 youth with the following criteria 1. Judicial order for out-patient sexual offender participated in the study 2. Absence of psychotic symptoms or mental retardation 3. Presence of local caregiver 4. Youth with age 11 and 17 5. Fluent in English or Spanish.</td>
<td>MST therapists worked in team with 4-6 families caseload per therapists. The MST services were provided at home and at community level like in school. The team was available to respond into crises 24 hours per day, 7 days a week. Youth in TAU-JSO group were referred for sexual offender-specific treatment whereby majority received services provided by the Juvenile Probation Offender Unit (JSO Unit). A probation officers supervised the youth and had meeting in groups of about 8-10 youth for one hour weekly sessions.</td>
<td>Sexual behaviour problems, delinquency, substance use, externalizing symptoms and out-of-home placement</td>
<td></td>
</tr>
<tr>
<td>Löfholm, C.A 2009</td>
<td>Random assignment to treatment conditions MST (6 MST sites) and TAU. Data were collect at pre-treatment and 24 month follow-up assessment. Mixed factorial design with 50/50 random allocation to treatment conditions, was used.</td>
<td>Participants were young people aged between 12 and 17 and met the criteria of clinical diagnosis of conduct disorder according to Diagnostic and statistical manual of mental disorder (DSM-IV-TR). There were 156 participants 95 (61%) boys and 61 (39%) girls. The families which participated 47% had no Swedish heritage and spoke other language.</td>
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</tr>
</tbody>
</table>
than Swedish, 13% had one parent who was born in other country than Sweden, 40% had both parents with Swedish heritage.

| Interventions | MST service were provided by a program licensed by MST Inc. Weekly expert consultation by phone, quarterly onsite booster sessions, and biannual implementation review were delivered by MST Consultant in charge. Quality assurance assessment was done to measure adherence to MST nine principles. The most common intervention for participants in this group was individual counseling by case manager or private counselor and was funded by Social Welfare Administration. Other intervention included family therapy, mentorship whereby people volunteers with no professional background spent time with young people. Less frequent services such as Aggression Replacement Treatment, special education services and addiction treatment was also provided. |
| Notes | Internalizing and externalizing symptoms, self reported delinquency, alcohol and drug dependence |

Ogden, T 2007

| Methods | Random assignment to treatment conditions. Data were collected at pre-treatment, post treatment and at 2 years follow-up. The families had 6/10 chances of being in MST group and 4/10 chances of receiving RS (Regular Welfare Services). Weighted randomizations was used |
| Participants | There were 75 participants of which 48 were boys, and 27 were girls. Participants were between 12 and 17 years of age or average age of 15.07 years who fulfilled the criteria of problem behaviour and they were recruited through Municipal Child Welfare Services. |
| Interventions | MST treatment was delivered by four teams, with each team having three or four therapist. All MST therapist had a bachelor or master degree in social work, psychology or education, with others having additional training in family therapy. One MST clinical supervisor had a degree in social work and two were licensed psychologist. |
| Outcomes | Out-of-home placement, self reported delinquency, Internalizing and Externalizing Behaviour |
| Notes | The sample for this study was taken from (Ogden & Halliday-Boykins, 2004) previous sample of 104 families |

Schaeffer, C.M, 2005

| Methods | Random assignment to treatment condition, with simple random toss of a coin. Assessment were done at pre-treatment, post treatment, 4 years follow-up and average of 13.7 years follow-up |
| Participants | Participants were 176 adolescent offenders, with age between 12 and 17 with their family. They were refereed to the Missouri Delinquency Project by Juvenile court personnel from July 1983 to October 1986. Participant had at least two arrests, during the study was living with at least one parent and showed evidence of psychosis or dementia. |
| Interventions | MST treatment was provided by three female and three male graduate students in clinical psychology, with 1.5 years direct clinical experience with children and adolescents prior to their studies. Therapist supervision was provided by Charles M. Borduin of University of Missouri, in 3 hours per week meetings and throughout the investigation. Individual treatment (IT) was provided by three female and three male at the local mental out-patient agencies, plus the treatment branch of the juvenile court. Each therapist had a master degree or equivalent training in social work, psychology or mental health related field and had about 4 years of direct clinical experience with adolescents. The therapist had 2.5 hours per week case review meeting with treatment coordinator from juvenile court. |
| Outcomes | violent offences, drug related offences |
| Notes | Supervisor to MST therapist was one of author of the research report and developer of MST. |

Sundell, K 2008

| Methods | Random assignment to treatment conditions. Data was collected at pre-treatment and 7 month post treatment. Mixed factorial design was used with 50/50 chance allocation to |
## Participants
Youth aged between 12 and 17 years who meet the criteria of clinical conduct disorder to the *Diagnosis and Statistic Manual of Mental Disorder* (DSM IV-TR). The sample had 95 (61%) boys and 61 (39%) girls.

## Interventions
There were six MST teams each with clinical supervisor and 3-4 therapists, making 6 clinical supervisors and 20 therapists. All 20 had educational training equivalent to master or bachelor of art degree in social work (n=17), psychology (n=2) and educational sociology (n=1). Twelve therapists of the 20 therapist had additional training in either family therapy or cognitive behavioral therapy. Out 79 youth assigned to MST, 75 started the treatment. The MST team was not able engage 2 youth, one was placed to residential care and one was sent to his home country by the parents. Youth in TAU group was referred back to social services for the determination of further intervention such as counseling (n=20) 1-2 hours per week by case manager or private counselor, family therapy (n=16) mentorship (n=12), and out-of-home care and primary residential care (n=8).

## Outcomes
Self reported delinquency, alcohol dependence, drug dependence, internalizing and externalizing, social competence skills, days in out of home placement.

## Methods
Timmons-Mitchell, J 2006

### Participants
93 youth took part in randomized control trial, MST (48) and TAU (45). The mean age of the youth were 15.1 years, 22% female and 78% male. Participants composed of 15.5% African American, 77.5% European American, 4.2% American Hispanics and 2.8% Biracial.

### Interventions
MST group consisted of one master level supervisor, and 14 master's degree holders’ therapists with 4-6 families caseload per therapist. Out of 14 Therapists, 9 (64%) were female and 5 (36%) were male, 3 (21%) were African American and 11 (79%) were European American. TAU group was referred to probation officers who indicated that referral were made to drug and alcohol counselors, anger management groups, and individual and family therapies.

### Outcomes
Reduction in re arrest, improvement in school, home, community, mood/emotion and substance use.
**Table 2: Characteristics of Excluded Studies**

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellis 2005</td>
<td>The relevant intervention and methods but different sample (Adolescent with Type 1 Diabetes) and outcome measure</td>
</tr>
<tr>
<td>Ellis 2008</td>
<td>Not focusing on youth with conduct disorder/juvenile delinquents/offenders but on Adolescent with Type 1 Diabetes.</td>
</tr>
<tr>
<td>Henggeler 1997</td>
<td>Relevant intervention, outcome measures and sample but focusing on the role of treatment fidelity</td>
</tr>
<tr>
<td>Olsson 2010</td>
<td>Relevant intervention, method and sample but the study focus on cost analysis of MST</td>
</tr>
<tr>
<td>Rowland 2008</td>
<td>Relevant intervention, method and outcome measures but the study specifically drew siblings as the sample</td>
</tr>
<tr>
<td>Schoenwald 2009</td>
<td>Non-random allocation to treatment. The study focused on the relationship between Therapist adherence to MST and youth criminal outcomes</td>
</tr>
<tr>
<td>Swenson 2010</td>
<td>Relevant intervention, method, however the sample consisted of youth who experienced neglect and/or physical abuse</td>
</tr>
<tr>
<td>Tolman 2008</td>
<td>Non-random allocation to treatment. The study focus is on validity of Therapist rated outcomes measures for MST</td>
</tr>
</tbody>
</table>
Part IV
Presentation of Results and Review Conclusion
6. Results

Results summary are presented in Table 2, where eight outcome measures (scale) were analyzed using Review Manager. In the analysis, four scales (Internalizing and Externalizing behavior/symptoms, Substance use and Arrests) provided data which were further divided into subscales. Some outcome measures were reported in more than one study while others were reported in single study. In general individual outcome measures favored MST than other services, except in externalizing behavior/symptoms scale where the results were visually the same. However, the analysis of subscale and individual studies, in this scale, showed some favoring MST and other favoring other services.

Table 3. Results Summary

<table>
<thead>
<tr>
<th>Scale or Subscale</th>
<th>Studies</th>
<th>Participants</th>
<th>Statistical Method</th>
<th>Effect Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Out-of-home Placement</td>
<td>2</td>
<td>204</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.32 [-0.88, 0.24]</td>
</tr>
<tr>
<td>2. Self Reported Delinquency</td>
<td>4</td>
<td>547</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.12 [-0.32, 0.08]</td>
</tr>
<tr>
<td>3. Internalizing Behavior/Symptoms</td>
<td>5</td>
<td>1056</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.23 [-0.46, -0.00]</td>
</tr>
<tr>
<td>3.1 Youth report</td>
<td>4</td>
<td>514</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.21 [-0.39, -0.04]</td>
</tr>
<tr>
<td>3.2 Parents and Caregivers Report</td>
<td>3</td>
<td>387</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.15 [-0.57, 0.28]</td>
</tr>
<tr>
<td>3.3 Teachers Report</td>
<td>1</td>
<td>75</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-1.14 [-1.64, -0.64]</td>
</tr>
<tr>
<td>3.4 Young Adult Self-Report</td>
<td>1</td>
<td>80</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>0.11 [-0.33, 0.55]</td>
</tr>
<tr>
<td>3.5 Drug Related Offences</td>
<td>1</td>
<td>176</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.38 [-0.67, -0.08]</td>
</tr>
<tr>
<td>3.4 Violent Offences</td>
<td>2</td>
<td>312</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>0.04 [-0.18, 0.26]</td>
</tr>
<tr>
<td>3.5 Alcohol Dependence</td>
<td>2</td>
<td>312</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.05 [-0.27, 0.17]</td>
</tr>
<tr>
<td>5. Substance Use</td>
<td>5</td>
<td>1053</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.13 [-0.28, 0.02]</td>
</tr>
<tr>
<td>5.1 Marijuana Use</td>
<td>1</td>
<td>80</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.09 [-0.53, 0.35]</td>
</tr>
<tr>
<td>5.2 Cocaine Use</td>
<td>1</td>
<td>80</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.03 [-0.47, 0.41]</td>
</tr>
<tr>
<td>5.3 Drug Related Offences</td>
<td>1</td>
<td>176</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.38 [-0.67, -0.08]</td>
</tr>
<tr>
<td>5.4 Drugs Dependency</td>
<td>2</td>
<td>312</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>0.04 [-0.18, 0.26]</td>
</tr>
<tr>
<td>5.5 Alcohol Dependence</td>
<td>2</td>
<td>312</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.05 [-0.27, 0.17]</td>
</tr>
<tr>
<td>5.6 Substance Use</td>
<td>1</td>
<td>93</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.59 [-1.00, -0.17]</td>
</tr>
<tr>
<td>6. Violent Offences</td>
<td>1</td>
<td>176</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-1.25 [-1.57, -0.92]</td>
</tr>
<tr>
<td>7. Non Violent Offences</td>
<td>1</td>
<td>176</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.46 [-0.76, -0.16]</td>
</tr>
<tr>
<td>8. Arrest</td>
<td>2</td>
<td>189</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.63 [-0.92, -0.33]</td>
</tr>
<tr>
<td>8.1 Arrest of Sexual Crime</td>
<td>1</td>
<td>48</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.85 [-1.45, -0.26]</td>
</tr>
<tr>
<td>8.2 Arrest in other Crime</td>
<td>2</td>
<td>141</td>
<td>Std. Mean Difference (IV, Random, 95% CI)</td>
<td>-0.55 [-0.89, -0.22]</td>
</tr>
</tbody>
</table>
The table above provides a summary of the type of scale and subscale used in the analysis, distribution of studies and participants in each scale and subscale, measure of treatment effects (SMD, 95% confident interval and Random effects) and effects estimate. A more detailed information on the outcomes measure (scales) analyses to determine the effects size and consistence is provided in the text below, in addition to the corresponding information presented in Figure 4-11 in the Appendix.

6.1 Out-of-home placement
Two studies reported data for out-of-home placement for 48 juvenile sexual offenders (Borduin 2009) and 156 youth with conduct disorder (Sundell 2008), see figure 4 in the appendix. Results from individual studies showed that MST cases were less likely to be in out-of-home placement than other services, and after the chi-squared analysis of study heterogeneity the results indicates moderate heterogeneity with $I^2 = 67\%$ and (95% CI -.88-0.24) confidence interval. However results from test of overall effect did not provide strong evidence to support that MST had effects on out-of-home placement.

6.2 Self Reported Delinquency
Four studies (Henggeler 2002; Löfholm, 2009; Ogden 2007; Sundell 2008) reported data for self reported delinquency with 467 youth with conduct disorder or substance abuse, see figure 5 in the appendix. Three studies showed to favor MST (Henggeler 2002; Löfholm, 2009; Ogden 2007) and one study favoring other services (Sundell 2008). The results shows that differences between MST and other services do not provide strong evidence of the effect of MST (SMD -.12, 95%CI -.88-0.24). The results also do not show whether there is consistence of the effects between studies these studies.

6.3 Internalizing Behavior/Symptoms
In the internalizing behavior/symptoms scale, five studies with 594 participants reported data which favors MST than other services see figure 6 in the appendix. The results of this scale shows that MST has significant effects on internalizing behavior/symptoms (p=0.05) and substantial heterogeneity between studies (p=0.0007) $I^2 = 70\%$. These results have also been analyzed and presented in four subscales, as shown below.
In youth report subscale, results from three studies (Sundell 2008; Löfholm, 2009; Letourneau 2009) favored MST and one study (Ogden 2007) showed almost no difference between MST and other services. The chi-squared analysis to determine heterogeneity across studies did not provide enough evidence of the difference in effects between studies, but the result from test of overall effects shows that MST has significant effects on internalizing behavior/symptoms.

On parents and caregivers report subscale, data from one study (Löfholm, 2009) favored other services, one study (Ogden 2007) favored MST, while one study (Sundell 2008) showed almost no difference between MST and other services on internalizing behavior/symptoms. The results shows a significant effects of MST on internalizing behavior/symptoms, with considerable heterogeneity after chi-squared analysis (p=0.01) $I^2 = 76\%$. This means that under this subscale, the results not only shows effects of MST on internalizing behavior/symptoms but it also shows that these effects varies across studies.

Reported data from one study (Ogden 2007) under teachers report subscale showed that MST has effects on internalizing behavior/symptoms. However, there were no other studies in this subscale for chi-squared test of heterogeneity. In youth adult self report subscale, data from one study (Henggeler 2002) showed no strong evidence of MST effects, and the heterogeneity test was not applicable since there were no other studies in this subscale for comparison.

### 6.4 Externalizing behavior/symptoms

Data from externalizing behavior/symptoms scale showed no strong evidence of MST effects with (SMD -.02, 95% CI -.19-0.15), see figure 7 in the appendix. The results did not provide any strong evidence of heterogeneity between studies after chi-squared analysis (p=0.10) $I^2 = 42\%$. The results did not provide strong evidence of MST effects, but this does not rule out that they exist.

In youth report subscale, results from two studies (Löfholm, 2009; Letourneau 2009) favored MST than other services, while data from (Ogden 2007; Sundell 2008) provided almost no
difference between MST and other services. The results did not provide strong evidence of MST effects and that MST is consistence across studies.

The results from two studies (Löfholm, 2009; Sundell 2008) in parents and caregivers report subscale favored other services, while one study (Ogden 2007) favored MST. The results did not provide strong evidence to suggest either MST has effects on externalizing behavior/symptoms or to provide enough evidence of heterogeneity between studies. However, the results suggest that other services had more effects on externalizing behavior/symptoms than MST.

The study (Henggeler 2002) which provided data for youth adult report subscale favored other services than MST. There was no comparable study in this subscale determine the existence of heterogeneity, and the results (SMD .16 95% CI -.28-.60) did not provide strong evidence that MST had effects on externalizing behavior/symptoms.

6.5 Substance use

Five studies (Henggeler 2002; Löfholm, 2009; Sundell 2008; Schaeffer 2005; Timmons-Mitchell 2006) with 741 participants provided data for substance use scale in which the results were not statistically significant to indicate effects of MST on substance use, see figure 8 in the appendix. The evidence did not suggest otherwise either, but that does not mean that there are no effects at all. The individual study analysis is explained in the subscale below.

Data from one study (Henggeler 2002) reported results of marijuana subscale in which the results favored MST than other services. However, the difference between MST and other services was very small. The results did not provide strong evidence that MST has effects on marijuana and the test for heterogeneity was not applicable in this subscale.

In the cocaine use subscale, results from one study (Henggeler 2002) showed almost no difference between MST and other services. The results did not provide strong evidence to show effects of MST on cocaine use. The chi-squared analysis to determine heterogeneity was not applicable in this subscale.
One study (Schaeffer 2005) reported data for drug related offences subscale, and the results favored MST than other services. The results also showed that MST has effects on drug related offences (p=0.001). Heterogeneity test is not applicable on this subscale.

Results from one studies (Löfholm, 2009) favored other services than MST while data from another study (Sundell 2008) favored MST slightly than other services on drug dependency subscale. The difference was however very small between MST and other services on the second (Sundell 2008) study. After the chi-squared test, the results showed that there is heterogeneity across studies, but the results did not provide strong evidence of effects of MST on drug dependency.

Alcohol dependency subscale reported data from two studies (Löfholm, 2009; Sundell 2008) which favored MST than other services. The results did not provide evidence of heterogeneity after chi-squared analysis (p=0.7) I² =0% and also the results did not provide strong evidence of effects of MST on drug dependency.

The substance use subscale reported data from one study (Timmons-Mitchell 2006) where results favored MST than other services. Because there was only one study the chi-squared analysis is not applicable, but the test for overall effects shows that that MST has effects on substance use after z test Z=2.77 (p=0.006).

6.6 Violent Offences
Only one study (Schaefer 2005) provided data for violence offences scale, and the results favored MST, see figure 9 in the appendix. The results also showed that MST has effects on violence offences, but since it was only one study in this scale the heterogeneity test was not applicable.

6.7 Non-Violence Offences
The results on non-violence offences scale from one study (Schaeffer 2005) favored MST than other services, see figure 10 in the appendix. The results provided evidence that MST has effects on non-violence offences after z test Z=2.99 (p=003).
6.8 Arrest

Two studies (Borduin 2009; Timmons-Mitchell 2006) provided data for arrest scale and the results showed that MST has effects on arrest after z test $Z=4.19$ ($p<0.0001$), see figure 11 in the appendix. The results did not provide enough evidence to suggest that there is heterogeneity between studies. The analysis of individual studies is below.

In arrest of sexual crime subscale, one study (Borduin 2009) provided data for analysis. The results favored MST than other services, and the results also shows that MST has effects on arrests for sexual crime. Chi-squared analysis of heterogeneity between studies does not apply because there was no other study provided data for comparison.

Two studies (Borduin 2009; Timmons-Mitchell 2006) provided data for arrest in other crime subscale which all favored MST than other services. The results shows that MST has effects on arrest on other crimes, but the evidence did not indicate the heterogeneity between studies ($p=0.94$) $I^2 =0\%$
7. Discussion

Eight randomized control trial of MST were included in this review after meeting the inclusion criteria. Five studies provided the ITT analysis, three out of five providing a well defined ITT analysis and follow-up observation for the outcome measure. The ITT analysis for three studies was not clearly defined; two studies provided the analysis of attrition which explained the number of dropout and retention level. After the analysis of attrition, these studies concluded that the drop out did not caused any significant different on treatment assessment. To conclude that an intervention has effects basing only on participants who completed the program may be misleading. Studies that did not adequately conducted ITT analysis may have provided a misleading information of effects of MST on juvenile delinquency and youth conduct disorder in the clinical trials. The difference in proportions of participants who drop out of treatment, could lead into different outcome between studies if intent to treat analysis is conducted.

The reviewer concurs with the assessment by Littell et (2005) that it is not possible to establish whether data from psychosocial outcome were affected by demand characteristic of the experiments (expectancy or allegiance effects). The post-treatment assessment data therefore may have not provided the true reflection of the treatment conditions. Allegiance effects may have occurred when the program staffs were interviewed to provide data for psychosocial outcome measure (self reported delinquency and internalizing and externalizing behavior/symptoms). Since some studies did not provided a clear method of concealing allocation, there is also a possibility that some participants may have a foreknowledge of group assignment which could have influenced their responses on psychosocial outcome measure. Blinding of participants and caregivers was not clearly explained in the included studies, which may have had influence on how they reported. The reviewer cannot rule out the possibility that staffs who participated in data collection for treatment conditions have not influenced its outcomes.

Included studies in this review differ in terms of methodology, sample characteristics, geopolitical context, intensity of MST, observation time and comparison conditions. A random effects model was used to detect heterogeneity between studies. With small sample size of individual studies and number (eight) of included studies in this review, the statistical power to
detect heterogeneity was low (Littell et al. 2005 had similar observation), with fairly wide confidence interval which shows uncertainty in effect size. There is statistical evidence of heterogeneity in one outcome measure (internalizing behavior/symptoms); however, in most of the outcome measures the results did not detect significant heterogeneity between studies. The detection of heterogeneity may be due to difference in baseline level of delinquency and conduct disorder in the participants, geographical differences of the participants (included studies were conducted in USA, Norway and Sweden), difference in the follow-up length of participants between studies and difference in the proportions of drop out between studies.

According to Dr Henggeler (one of MST program developer) (vimeo website 8), adherence to nine principles (treatment fidelity) is the key in achieving the desirable outcomes. Whether the MST treatment fidelity was followed or not, the difference in extent of the problem between participants of different studies measuring the effectiveness of MST is likely to lead to different outcomes. Participants from Norway and Sweden are likely to share more similarities on, geo-politic, cultural and ethnicity backgrounds than those from USA. A Cultural and ethnicity background influence on how intervention should be carried out. The geo-political context of countries where MST is implemented is likely to influence how the intervention is implemented and by whom. In USA issues related to juvenile delinquency and youth conduct disorder is dealt by justice department, while in Sweden and Norway it is dealt by social services or Municipal social welfare agency. These approaches may each have different influence on how the MST is conducted, which may lead to differences on how participants respond to MST.

The difference in therapists’ qualifications (master or bachelor degrees, graduate students and experienced therapist, and difference in professional background eg. social workers, teacher and psychologist) is likely to play part in the treatment outcome. The difference on timeframe for follow-up studies (not having a clear standard in follow up period) is likely to lead to different outcomes, with follow-up studies that are conducted short time after the intervention likely to differ from those conducted extended period of time. Unstandardized observation period as observed in Littell (2005) showed that the elapsed time varied across cases within studies and some were fairly substantial. In this review, for example in the study with 75 youth who fulfilled the criteria of problem behavior (Ogden 2007) the follow-up period was 2 years after post
treatment analysis while in the study with 176 adolescent offenders (Schaeffer 2005) the follow-up period was 4 years after post treatment assessment.

In general the results from included studies favored MST than other services, however, when combined, the results shows no strong evidence of the effects of MST in most of the outcome measures. However, two outcome measures (internalizing behavior/symptoms and arrest) showed that that MST has effects on juvenile delinquency and youth conduct disorder. Some findings in this review, but not all, have also been observed in other review (eg. Littell et al 2005). This occurred despite the fact that none of the included studies in this review match studies from other reviews. For example this review include studies from 2002-2009, while in Littell et al (2005) included studies from 1990-2004. This study also included only published studies. The analysis in Littell et (2005) was partly based on the assessment of unpublished study in Ontario (Lescheid & Cunningham, 2002) which showed that the outcome between MST participants and participants in other services did not differ significantly. This review also refer to two key findings in Mitchell-Herzfeld et (2008) (this study is not one of 8 included studies in meta analysis) suggest that participants who received MST were rearrested at about the same rate as that of control group in both pilot and post pilot period. In addition evidence in this study did not show that MST is effective or less effective in youth who had mental health issues versus those who didn’t.

Unlike other review, the results from this review have showed that MST has effects in two outcome measure (internalizing symptoms/behavior and arrest) even though in out-of-home placement, self reported delinquency, externalizing behavior/symptoms and substance abuse the results did not provide strong evidence of effects of MST. The review finding also provided evidence of substantial heterogeneity in internalizing symptoms/behavior but results did not provide strong evidence heterogeneity for other outcome measures. The reviewer cannot ignore the fact that MST have effect in some outcome measures, neither can the reviewer ignore the fact that results from most of the outcome measures did not provide strong evidence that MST has effects on juvenile delinquency and youth conduct disorder. In other words, large part of the results does not suggest that MST has effects on juvenile delinquency and youth conduct disorder and but it suggest that, there is no significant difference between included studies.
Nevertheless, the availability of some effects suggests that there is a possibility that some effects could not be detected. Therefore, given the fact that most of the outcome measures did not suggest that there are effects of MST; this review cannot conclude that MST is more effective than other services but can conclude that, there are no strong evidence of inconsistency between studies.
8. Reviewer’s Conclusions.

8.1 Implication for Practice

Randomized control trials have provided evidence that MST is more effective intervention than other services. This review was conducted to appraise the effects of MST on juvenile delinquency and youth conduct disorder, and establish if the effects are consistent between studies. MST is extensively researched, comprehensive intervention based on a solid theoretical foundation. There is no the evidence to suggest that MST has negative impact or effects (also observed in Littell et al 2005) on juvenile delinquency and youth conduct disorder compared to other services nor does it suggest that any particular intervention is more effective and consistent than MST.

The knowledge about the cost of MST should be expanded by conducting comparative studies of cost benefit analysis between MST sites. It is important that additional independent studies are conducted to refute or confirm the premise that MST is more effective and consistent intervention for juvenile delinquency and youth conduct disorder than other services. Littell (2006) suggest that before programs like MST is transported, funders and consumer should ask for independent evaluations of their effectiveness. She believed that without independent evaluations, sudden increase of interventions, based on few non-independent trials, may hinder the effort to find effective intervention. She suggested that it is important to understand mechanisms of effective intervention, such as the component of MST which is responsible for variation in outcome, using what she described as treatment dismantling strategy.

This review is the result of curiosity in promoting knowledge about effective intervention on youth problem behavior. It incorporated studies from Norway, Sweden and USA in the final analysis which indicates the difference on structure of youth services. As mentioned earlier, the youth problem behavior in USA is dealt by justice system, while in Norway and Sweden is dealt by social service/municipal welfare agency. There is a possibility that key players in dealing with youth problem behavior are different, and the way the problem is defined is also different. This might well be reflected on the thinking on youth policies and the nature of welfare regimes between these countries.
This brings the question as to whether it’s possible to have a uniform intervention between countries, or whether intervention such as MST may have to be modified to fit into the local systems. This review add to the debate about evidence based practice, would like challenge social workers to take a proactive role in research and social workers challenging research findings in order to raise the standard of youth interventions. Additional knowledge about transportability of MST from USA to 13 different countries worldwide is required. It will help to understand the fit into geo-political system of different countries, including challenges of replicating it into different welfare regime. Further systematic reviews are required to facilitate improvement of MST program, since there is no such thing as perfect intervention.

8.2 Implications for research

Since most of MST studies are randomized clinical trials, it is important that future studies provide detailed description of intent to treat analysis. There are studies which support this analysis; nevertheless there is a need to incorporate this analysis in more studies so as to generate results that reflect entire randomized sample. In clinical setup, there is assumption that some patients will not fully comply with treatments. Excluding non-compliant participants (eg. protocol deviation), or withdraw (dropout) in the analysis tend to bias the research outcome or treatment evaluation. The bias rises because compliant participants tend to give better outcomes than non-compliant participants regardless of the treatments.

Computer generated randomization systems, with only principal investigator to have access to randomization sequence should be used in future studies for concealing the allocation, whenever possible. In additional to that is the content of sealed envelope should be determined in centralized randomization location separate from the research location, prior to referral into treatment conditions. The use of coin toss is not the best way to conceal the allocation, since it posses the risk of participants foreknowledge of which treatment they will receive. Instead of being seen as a threat to existence of intervention such as MST, systematic review should be viewed as evaluation of the evaluator. It is important to encourage independent evaluation studies, and systematic review so as to remove doubts and bring more transparent to interventions and promote research values.
Not all studies will enable blinding of participants, therapists, families and other interested parties such as police or child protection agencies, but it important for blinding to take place. Future research should consider blinding whenever possible. This will minimize bias especially during post-treatment analyses (assessment conducted immediately after end of treatment), where families, teachers, therapists and participants provide psychosocial data for assessment. There should be independent researchers who have no ties to the treatment conditions/programs to collect short term data (post treatment data) for assessment.

In these times when there is some evidence that scientific community is influenced by politics and personal interests, it is probably necessary to be skeptical about scientific findings. Being skeptical in this case means re-examining evidence brought forward by science, conducting further independent studies to prove or refute effectiveness of interventions like MST. This way those who depends on science to make decisions that affects the lives of youth, their families and communities, will be well informed about what works, by whom and for whom. In additional, the patients/clients have the right to be well informed about choices they make, and this can only happen if the scientific community is constantly critical on others and itself.
Reference:


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http://www.colorado.edu/cspv/blueprints/modelprograms/MST.html 3

MST website,
http://mstservices.com/index.php/what-is-mst/nine-principles 2
http://mstservices.com/index.php/what-is-mst/treatment-model_1
http://mstservices.com/SDR/Supervisor_Orientation-Therapist_Recruitment_Toolkit_HO.pdf 4

Centre for study of social policy website 6

Cochrane website 7
http://ims.cochrane.org/revman.

Criminological theory on the web 5

Vimeo website 8
http://vimeo.com/10768664
Appendix:
1: Included studies

Reference Type: Journal article
Author: Ogden, T & Hagen, K.A
Title: Multisystemic Treatment of Serious Behaviour Problems in Youth: Sustainability of Effectiveness Two Years after Intake
Source: Association for Child and Adolescent Mental Health
Year: 2006
Volume: 11: No 3
Page: 142-149
Publisher: Blackwell Publishing

Reference Type: Journal article
Author: Schaeffer, C.M & Borduin, C.M
Title: Long-Term Follow-Up to a Randomized Clinical Trial of Multisystemic Therapy with Serious and Violent Juvenile Offenders
Source: Journal of Consulting and Criminal Psychology
Year: 2005
Volume: 73: No 3
Page: 445-453
Publisher: American Psychological Association

Reference Type: Journal article
Author: Borduin, C.M, Schaeffer, C.M & Heiblum, N
Title: A Randomized Clinical Trial of Multisystemic Therapy with Juvenile Sexual Offenders: Effects on Youth Social Ecology and Criminal Activity
Source: Journal of Consulting and Clinical Psychology
Year: 2009
Volume: 77: No 1
Reference Type: Journal article
Author: Sundell, K, Hansson, K, Löfholm, C.A, Olsson, T, Gustle, L.H & Kadesjö, C
Title: The Transportability of Multisystemic Therapy to Sweden: Short-Term Result From a Randomized Trial of Conduct-Disordered Youth
Source: Journal of Family Psychology
Year: 2008
Volume: 22: No 3
Page: 550-560
Publisher: American Psychological Association

Reference Type: Journal article
Author: Henggeler, S.W, Clingempeel, W.G, Brondino, M.J & Pickrel, S.G
Title: Four-Years Follow-up of Multisystemic Therapy With Substance-Abusing and Substance-Dependant Juvenile Offenders
Source: Journal of American Academy of Child and Adolescent Psychiatry
Year: 2002
Volume: 41: No. 7
Page: 868-874
Publisher: Journal of American Academy of Child and Adolescent Psychiatry

Reference Type: Journal article
Author: Letourneau, E.J, Henggeler, S.W, Schewe, P.A, Borduin, CM & Saldana, L
Title: Multisystemic Therapy for Juvenile Sexual Offenders: 1-Year Results from a Randomized Effectiveness Trial
Source: Journal of Family Psychology
Year: 2009
Volume: 23: No 1
Page: 89-102

Reference Type: Journal article
Author: Löfholm, C.A, Olsson, T, Sundell, K & Hasson, K
Title: Multisystemic Therapy With Conduct-Disordered Young People: Stability of Treatment Outcomes Two Years after Intake
Source: Evidence & Policy
Year: 2009
Volume: 5: No 4
Page: 373-397
Publisher: The Policy Press

Reference Type: Journal article
Author: Timmons-Mitchell, J, Bender, M.B, Kishna, M.A & Mitchell, C.C
Title: An Independent Effectiveness Trial of Multisystemic Therapy with Juvenile Justice Youth
Source: Journal of Clinical Child and Adolescent Psychology
Year: 2006
Volume: 35: No 227-236
Page: 373-397
Publisher: The Policy Press

2 Excluded Studies
Reference Type: Journal article
Authors: Ellis, D.A, Frey, M.A, Naar-King, S, Templin, T, Cunnigham, P & Cakan, N
Title: Use of Multisystemic Therapy to Improve Regimen Adherence Among Adolescents with Type 1 Diabetes in Chronic Poor Metabolic Control

Source: Diabetes Care

Date of Publication: 2005

Volume: 28 No. 7

Pages: 1604-1610

Publisher Name: American Diabetes Association

Reference Type: Journal article

Authors: Ellis, D, Naar-King, S, Templin, T, Frey, M, Cunnigham, P, Sheidow, A, Cakan, N & Idalski, A

Title: Multisystemic Therapy with Poorly Controlled Type 1 Diabetes: Reduced Diabetic Ketoacidosis and Related Cost over 24 Months

Source: Diabetes Care

Date of Publication: 2008

Volume: 31 No 9

Pages: 1746-1747

Publisher Name: American Diabetes Association

Reference Type: Journal article


Title: Multisystemic Therapy with Violent and Chronic Juvenile Offenders and their Families: The Role of Treatment Fidelity in Successful Dissemination

Source: Journal of Consulting and Clinical Psychology

Date of Publication: 1997
Intervening in Youth Problem Behaviour in Sweden: A Pragmatic Cost Analysis of MST from a Randomized Trial with Conduct Disordered Youth

Rowland, M.D, Chapman, J.E & Henggeler, S.W

Sibling Outcome from Randomized Trial of Evidence Based Treatments with Substance Abusing Juvenile Offenders

Rowland, M.D, Chapman, J.E & Henggeler, S.W
Authors: Schoenwald, S.K, Chapman, J.E, Sheidow, A.J & Carter, R.E
Title: Long-Term Youth Criminal Outcomes in MST Transport: The Impact of Therapist Adherence and Organizational Climate and Structure
Source: Journal of Clinical Child and Adolescent Psychology
Date of Publication: 2009
Volume: 38 No 1
Pages: 91-105
Publisher Name: Taylor and Francis Group, LLC

Reference Type: Journal article
Authors: Swenson, C.C, Schaeffer, C.M, Faldowski, R, Mayhew, A.M & Henggeler, S.W
Title: Multisystemic Therapy for Child Abuse and Neglect: A Randomized Effectiveness Trial
Source: Journal of Family Psychology
Date of Publication: 2010
Volume: 24 No. 4
Pages: 497-507
Publisher Name: American Psychological Association

Reference Type: Journal article
Authors: Tolman, R.T, Mueller, C.W, Daleiden, E.L, Stumpf, R.E & Pestle, S.L
Title: Outcome of Multisystemic Therapy in a Statewide System of Care
Source: Journal of Child and Family Studies
Date of Publication: 2008
Volume: 17
Figure 4-11: Outcome measure analysis

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>MST Mean</th>
<th>SD</th>
<th>Total</th>
<th>OS Mean</th>
<th>SD</th>
<th>Total Weight</th>
<th>IV, Random, 95% CI</th>
<th>Std. Mean Difference</th>
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<tbody>
<tr>
<td>Borduin, C.M 2009</td>
<td>339.42</td>
<td>24</td>
<td>1,042.5</td>
<td>3,121.04</td>
<td>24</td>
<td>40.8%</td>
<td>-0.67 [-1.25, -0.08]</td>
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</tr>
<tr>
<td>Sundell, K 2008</td>
<td>12.9</td>
<td>31</td>
<td>79</td>
<td>16</td>
<td>44.7</td>
<td>77</td>
<td>59.2%</td>
<td>-0.08 [-0.39, 0.23]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>103</td>
<td></td>
<td>101</td>
<td>100.0%</td>
<td>-0.32 [-0.88, 0.24]</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.11; Chi² = 3.00, df = 1 (P = 0.08); I² = 67%
Test for overall effect: Z = 1.11 (P = 0.27)

Figure 4: Out-of-home placement

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>MST Mean</th>
<th>SD</th>
<th>Total</th>
<th>OS Mean</th>
<th>SD</th>
<th>Total</th>
<th>IV, Random, 95% CI</th>
<th>Std. Mean Difference</th>
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<tbody>
<tr>
<td>Henggeler, S.W 2002</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>-0.17 [-0.61, 0.27]</td>
<td></td>
</tr>
<tr>
<td>Henggeler, S.W 2002</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>-0.45 [-0.90, -0.01]</td>
<td></td>
</tr>
<tr>
<td>Lobjeim, C.A 2009</td>
<td>29.64</td>
<td>29.64</td>
<td>29.64</td>
<td>29.64</td>
<td>29.64</td>
<td>29.64</td>
<td>-0.08 [-0.40, 0.23]</td>
<td></td>
</tr>
<tr>
<td>Ogden, T 2007</td>
<td>30.57</td>
<td>30.57</td>
<td>30.57</td>
<td>30.57</td>
<td>30.57</td>
<td>30.57</td>
<td>-0.26 [-0.72, 0.21]</td>
<td></td>
</tr>
<tr>
<td>Sundell, K 2008</td>
<td>39.5</td>
<td>39.5</td>
<td>39.5</td>
<td>39.5</td>
<td>39.5</td>
<td>39.5</td>
<td>0.15 [-0.17, 0.46]</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>290</td>
<td>290</td>
<td>290</td>
<td>290</td>
<td>-0.12 [-0.32, 0.08]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.01; Chi² = 5.28, df = 4 (P = 0.26); I² = 24%
Test for overall effect: Z = 1.20 (P = 0.23)

Figure 5: Self reported delinquency
Figure 6: Internalizing symptoms/behavior
## Figure 7: Externalizing symptoms/behavior

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Mean</th>
<th>SD</th>
<th>Total Mean</th>
<th>SD</th>
<th>Total Weight</th>
<th>IV, Random, 95% CI</th>
<th>IV, Random, 95% CI</th>
</tr>
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<tbody>
<tr>
<td><strong>1.4.1 Youth Report</strong></td>
<td>Letourneau, E.J 2009</td>
<td>40.8</td>
<td>10</td>
<td>67</td>
<td>44.9</td>
<td>9.7</td>
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<td></td>
<td>Löfholm, C.A 2009</td>
<td>18.68</td>
<td>9.26</td>
<td>79</td>
<td>20.82</td>
<td>10.22</td>
<td>77</td>
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<tr>
<td></td>
<td>Ogden, T 2007</td>
<td>15.93</td>
<td>8.26</td>
<td>46</td>
<td>15.56</td>
<td>10.32</td>
<td>29</td>
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<tr>
<td></td>
<td>Sundell, K 2008</td>
<td>65.2</td>
<td>15.6</td>
<td>79</td>
<td>64.9</td>
<td>15.1</td>
<td>77</td>
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<tr>
<td>Subtotal (95% CI)</td>
<td>271</td>
<td>243</td>
<td>51.6%</td>
<td>-0.16 [-0.36, 0.05]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Tau² = 0.01; Chi² = 4.09, df = 3 (P = 0.25); I² = 27%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 1.48 (P = 0.14)</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>1.4.2 Parents and Caregivers Report</strong></td>
<td>Löfholm, C.A 2009</td>
<td>19.65</td>
<td>13.48</td>
<td>79</td>
<td>16.06</td>
<td>10.66</td>
<td>77</td>
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<tr>
<td></td>
<td>Ogden, T 2007</td>
<td>12.88</td>
<td>8.85</td>
<td>46</td>
<td>14.39</td>
<td>9.62</td>
<td>29</td>
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<tr>
<td></td>
<td>Sundell, K 2008</td>
<td>72.1</td>
<td>17.1</td>
<td>79</td>
<td>69.9</td>
<td>19.1</td>
<td>77</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>204</td>
<td>183</td>
<td>38.5%</td>
<td>0.13 [-0.10, 0.36]</td>
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<td></td>
</tr>
<tr>
<td>Heterogeneity: Tau² = 0.01; Chi² = 2.55, df = 2 (P = 0.28); I² = 22%</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Test for overall effect: Z = 1.10 (P = 0.27)</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>1.4.3 Young Adult Self-Report</strong></td>
<td>Henggeler, S.W 2002</td>
<td>12.5</td>
<td>8.11</td>
<td>43</td>
<td>11.26</td>
<td>6.85</td>
<td>37</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>43</td>
<td>37</td>
<td>9.8%</td>
<td>0.16 [-0.28, 0.60]</td>
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<tr>
<td>Heterogeneity: Not applicable</td>
<td></td>
<td></td>
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<tr>
<td>Test for overall effect: Z = 0.72 (P = 0.47)</td>
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<td></td>
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<tr>
<td><strong>Total (95% CI)</strong></td>
<td>518</td>
<td>463</td>
<td>100.0%</td>
<td>-0.02 [-0.19, 0.15]</td>
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<tr>
<td>Heterogeneity: Tau² = 0.02; Chi² = 12.02, df = 7 (P = 0.10); I² = 42%</td>
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<tr>
<td>Test for overall effect: Z = 0.20 (P = 0.84)</td>
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<td></td>
</tr>
<tr>
<td>Test for subgroup differences: Chi² = 3.90, df = 2 (P = 0.14), I² = 48.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 8: Substance use
Figure 9: Violent offenses

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>MST</th>
<th>OS</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Borduin, C.M 2009</td>
<td>0.13</td>
<td>0.34</td>
<td>24</td>
<td>0.79</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Test for overall effect: Z = 2.82 (P = 0.005)</td>
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<td></td>
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</tr>
</tbody>
</table>

Total (95% CI) 92 84 100.0% -1.25 [-1.57, -0.92]
Heterogeneity: Not applicable
Test for overall effect: Z = 2.99 (P = 0.003)

Figure 10: Non violent offences

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>MST</th>
<th>OS</th>
<th>Std. Mean Difference</th>
<th>Std. Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Borduin, C.M 2009</td>
<td>1.46</td>
<td>3.27</td>
<td>24</td>
<td>4.88</td>
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<tr>
<td>Timmons-Mitchell, J 2006.44</td>
<td>1.5</td>
<td>22.9</td>
<td>1.5</td>
<td>45</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>72</td>
<td>69</td>
<td>75.6%</td>
<td>-0.55 [-0.89, -0.22]</td>
</tr>
<tr>
<td>Test for overall effect: Z = 3.22 (P = 0.005)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total (95% CI) 96 93 100.0% -0.63 [-0.92, -0.33]
Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 2 (P = 0.69); I² = 0%
Test for overall effect: Z = 4.19 (P < 0.0001)
Test for subgroup differences: Chi² = 0.75, df = 1 (P = 0.39), I² = 0%

Figure 11: Arrest